UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/777,876	02/07/2001	Arnaud Gueguen	202888US2	4116

			EXAMINER
22850	7590	06/03/2005	DEPPE, BETSY LEE

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ART UNIT	PAPER NUMBER
2637	

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Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	09/777,876	GUEGUEN, ARNAUD
	Examiner	Art Unit
	Betsy L. Deppe	2637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _28 January 2005_.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-26_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-7,9-12,25 and 26_ is/are rejected.

7)☒ Claim(s) _8 and 13-24_ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _28 January 2005_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

       1.☐ Certified copies of the priority documents have been received.

       2.☐ Certified copies of the priority documents have been received in Application No. _____.

       3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1.   Applicant's arguments filed January 28, 2005 have been fully considered but they are not persuasive.

2.   In response to applicant's argument on page 19 that Kim et al. does not discloses that the error checker determines or uses a threshold quantity and therefore, Kim et al. does not each or suggest "determining a threshold quantity characteristic of said decoding," steps 340 and 360 in Figure 3 of Kim et al. determines whether an error is generated and then stops iterative decoding when no error is detected. (See column 6, lines 11-23) The error corresponds to "characteristic quantity" in claim 1 and since Kim et al. stops iterative decoding when no error is detected, the "threshold quantity" in the recited claim is zero. It is inherent that there is a determination of the threshold quantity in order to set the threshold quantity.

3.   In response to applicant's argument on pages 19-20 that the CRC transmitted is not generated from each set of weighted output information items and that the CRC in Kim et al. is not equivalent to the characteristic quantity, the error signal that generated from the CRD check is equivalent to the characteristic quantity since the error signal is determined after the decoding. (See 190 in Figure 1)

4.   In response to applicant's argument on page 20 that Yi fails to disclose

"determining a threshold quantity characteristic" and "comparing said characteristic

quantity with said threshold quantity," one cannot show nonobviousness by attacking

references individually where the rejections are based on combinations of references.

See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800

F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this case, Kim et al. discloses these

limitations and the rejection of the claims is based on the combination of Kim et al. and

Yi.

5.   In response to applicant's argument on pages 21-22 that there is insufficient

evidence for motivation to modify the DAB system of Yi by incorporating the error

checker of Kim et al., the Examiner is not suggesting the incorporation of the error

checker in Kim et al. into the DAB system of Yi. Yi is cited to show that an iterative

Turbo decoder is used with a corresponding Turbo code encoder. (See Figures 3 and

6; column 8, line 21 - column 9, line 26; and column 12, lines 14-46) Therefore, it would

have been obvious to one of ordinary skill in the art at the time the invention was made

to combine the teachings of Kim et al. and Yi to form a data transmission system

comprising a Turbo encoder and a corresponding decoder for error correction wherein

the number of iterations in the decoding scheme are minimized.

        Although Yi teaches using Turbo encoders and decoders in a DAB system, it is

well-known to use these error control systems for data transmission in different

applications or systems, i.e. the use of Turbo encoders and decoders are not exclusive

to DAB systems. (For example, see Ebel, Sr. (US Patent No. 6,879,648 B2) and Wolf et al. (US Patent No. 6,898,254 B2)) Since the iterative decoding method of Kim et al. minimizes processing delays (see column 2, lines 7-10), it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the iterative decoding method disclosed by Kim et al. with a Turbo encoder such as that disclosed by Yi.

Furthermore, even though Kim et al. does not suggest incorporating an error check in a DAB system, Kim et al. does not preclude the use of the disclosed apparatus and method in a DAB system nor does it limit the use to transmission of a particular type of data or signal.

Drawings

6.   The drawings were received on January 28, 2005. Figures 1 and 2 of these drawings are accepted.

Claim Objections

7.   Claim 1 is objected to because of the following informalities: on line 16, "a threshold quantity characteristic" should be "a threshold quantity" in order to be consistent with line 10 and dependent claims (for example, see claim 6, line 3).

Claim Rejections - 35 USC § 103

8.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a)   A patent may not be obtained though the invention is not identically disclosed or described as
set forth in section 102 of this title, if the differences between the subject matter sought to be patented
and the prior art are such that the subject matter as a whole would have been obvious at the time the
invention was made to a person having ordinary skill in the art to which said subject matter pertains.
Patentability shall not be negatived by the manner in which the invention was made.

9.   Claims 1 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Kim et al. (US Patent No. 6,615,385 B1 cited in the Office Action mailed April 16, 2004)

in view of Yi (US Patent No. 5,907,582 cited in the Office Action mailed October 28,

2004).

10.   With regard to claim 1, Figures 1 and 3 of Kim et al. discloses the claimed

invention including (a) an iterative decoding comprising a plurality of elementary

decoding steps (120 and 150 in Figure 1) associated with interleaving and

deinterleaving steps wherein each of the elementary decoding steps receive a set of

information and generates a set of weighted output information items; (b) generating a

characteristic quantity from each set of weighted output items generated by each of said

elementary decoding steps (see column 5, lines 9-11); (c) comparing said characteristic

quantity to a threshold quantity (see step 340 and 360 in Figure 3); and (d) interrupting

said decoding when said characteristic quantity (i.e. the errors determined using CRC)

reaches the threshold quantity (see step 390 in Figure 3). (See also column 5, line 62 –

column 6, line 35)

However, Kim et al. does not teach the recited coding step and the plurality of

elementary decoding steps corresponding to a plurality of elementary coding steps

associated with at least one interleaving step. Yi discloses a system with a turbo code

encoder in Figure 3 and an iterative Turbo decoder in Figure 6 wherein the elementary

decoding steps correspond to the plurality of coding steps. (See also column 8, line 21-

column 9, line 26 and column 12, lines 14-46) Since Kim et al. does not provide details

of the Turbo encoder, it would have been obvious to one of ordinary skill in the art at the

time the invention was made to use the receiver of Kim et al. in a communication

system with the transmitter/encoder of Yi in order to recover turbo coded data without

incurring undue processing delay (see Kim et al. column 2, lines 7-10).

11.   With regard to claim 26, Kim et al. in view of Yi discloses the claimed invention

including a puncturing step in the coding step and a corresponding depuncturing step in

the decoding step. (See Yi, figures 3 and 6; column 9, lines 1-26; and column 12, line

37-43) It would have been obvious to one of ordinary skill in the art at the time the

invention was made to also implement the puncturing and depuncturing taught by Yi

into the method disclosed by Kim et al. in view of Yi in order to provide greater flexibility

in the code rate by enabling a change in the turbo rate without modifying the encoders.

12.   Claims 2-5 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Kim et al. in view of Yi as applied to claim 1 above, and further in view of Haller et

al. (US Patent No. 6,182,261 B1 cited in the Office Action mailed October 28, 2004).

13.   With regard to claim 2, Kim et al. in view of Yi discloses the claimed invention

except for calculating a quantity characteristic of a set of extrinsic information. Haller et

al. teaches calculating a quantity characteristic (i.e. LLR) of a set of extrinsic

information. (See column 10, lines 48-51) It would have been obvious to one of ordinary skill in the art at the time the invention was made to calculate a quantity characteristic (i.e. LLR) of a set of extrinsic information in Kim et al. in view of Yi in order to accurately decode the data by assessing the reliability of the information.

14.   With regard to claim 3, Kim et al. discloses the claimed invention except for calculating a statistical quantity characteristic of the set of weighted output information items. Haller et al. teaches calculating a statistical quantity (i.e. LLR) of a set of weighted output information items. (See column 10, lines 29-39) It would have been obvious to one of ordinary skill in the art at the time the invention was made to calculate a statistical quantity characteristic of the set of weighted output information items in Kim et al. in order to accurately decode the data by assessing the reliability of the information.

15.   With regard to claim 4, Kim et al. in view of in view of Yi and Haller et al. discloses the claimed invention except for calculating a means of an absolute value. Since Haller et al. discloses using an absolute value of probability values (see column 10, lines 29-33) or calculating an average or median of probability bits (see column 10, lines 56-58), it would have been obvious to one of ordinary skill in the art at the time the invention was made to also calculate the average/means of the absolute value in order simplify calculations by using only the absolute value while obtaining an accurate assessment of the probability bits over time.

16.   With regard to claim 5, Kim et al. in view of Yi and Haller et al. discloses the claimed invention including interrupting the decoding procedure when the characteristic

quantity is greater than the threshold quantity. (See Haller et al. column 10, lines 39-45)

It would have been obvious to one of ordinary skill in the art at the time the invention

was made to implement the conditions for stopping iterative decoding as disclosed by

Haller et al. into the method taught by Kim et al. in order to provide greater flexibility in

determining when to stop the iterative decoding and to avoid iteratively decoding the

received data when the received data is of sufficient quality but not necessarily error-

free, as required by the method in Kim et al.

17.   With regard to claim 25, Kim et al. in view of Yi and Haller et al. discloses the

claimed invention including the inputs and outputs of elementary decoding steps being

weighted, in terms of probabilities, likelihood ratios or log likelihood ratios. Since Haller

et al. discloses that iterative decoding techniques use LLR probabilities and soft data

from former iterations (see Haller et al. column 1, line 56 - column 2, line 10), it is

implicit that the inputs and outputs of the decoders in Kim et al. are weighted, in terms

of probabilities, likelihood ratios or log likelihood ratios

18.   Claims 6, 9, 11 and 12 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Kim et al. in view of Yi as applied to claim 1 above, and further in

view of Zhang et al. (US Patent No. 6,233,709).

19.   With regard to claim 6, Kim et al. in view of Yi discloses the claimed invention

except for determining the threshold quantity as a function of at least one configuration

parameter. Zhang et al. teaches varying a threshold quantity (e.g. the number of

iterations) as a function of at least one configuration parameter based on a quality of

service (QoS) requirements. (See column 1, lines 61 - column 2, line 13 and column 3, lines 46-63) It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the teaching of Zhang et al. into the method disclosed by Kim et al. in view of Yi in order to provide greater flexibility and to ensure quality of service in a changing environment without any unnecessary processing delays.

20.   With regard to claim 9, Kim in view of Yi and Zhang et al. discloses the claimed invention including selecting, using a reference table, the threshold quantity. (See Zhang et al. column 2, lines 9-14 and column 3, lines 58-63)

21.   With regard to claims 11 and 12, Kim et al. in view of Yi and Zhang et al. discloses the claimed invention except for determining the threshold quantity as a function of mean transmission time or mean energy consumption. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use different factors for determining the threshold quantity based on system requirements. The applicant has not disclosed that using a mean transmission time or mean energy consumption provides an advantage, is used for a particular purpose or solves a stated problem. Therefore, one of ordinary skill in the art would have considered different factors that affect the accuracy of data recovery and meet system requirements when determining the threshold quantity of the circuit disclosed by Kim et al. in view of Yi and Zhang et al.

22.   Claims 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Kim et al. in view of Yi and Zhang et al. as applied to claim 6 above, and further in view

of Doetsch et al. (WO 99/11009).

23.   With regard to claim 7, Kim et al. in view of Yi and Zhang et al. disclose the

claimed invention except for at least one of the recited configuration parameters.

Siemens discloses that the signal to noise ratio affects a quantity threshold (i.e. the

number of iterations) for a given quality of service criterion. (See page 11, lines 16-24)

Since Kim et al. in view of Yi and Zhang et al. discloses varying quantity threshold

based on quality of service requirements (see Zhang et al. column 1, line 66 - column 2,

line 6), it would have been obvious to one of ordinary skill in the art at the time the

invention was made to use signal-to-noise ratio instead of the bit error rate to adjust the

quantity threshold since they are both indicators of signal quality. Selecting an indicator

of signal quality for adjusting the quantity threshold depends upon system

considerations such as whether one is easier to determine or simplifies the circuit.

    Furthermore, the applicant has not disclosed that any of the recited configuration

parameters provides an advantage, is used for a particular purpose or solves a stated

problem. Therefore, one of ordinary skill in the art would have considered different

configuration parameters, including signal-to-noise ratio as disclosed by Doetsch et al.,

that affect the accuracy of data recovery when determining the threshold quantity of the

circuit disclosed by Kim et al. in view of Yi and Zhang et al.

24.   With regard to claim 10, Kim et al. in view of Yi and Zhang et al. disclose the

claimed invention except for selecting the threshold quantity based in part on a

complexity of the decoding. Doetsch et al. discloses varying a quantity threshold (i.e.

the number of iterations) based on coding complexity. (See page 11, lines 12-16)·

Since decoding complexity corresponds to coding complexity, it would have been

obvious to one of ordinary skill in the art at the time the invention was made to adjust

the threshold quantity in Kim et al. in view of Yi and Zhang et al. based on the decoding

complexity in order to provide greater flexibility and for accurate data recovery without

requiring unnecessary processing delays.

Allowable Subject Matter

25.   Claims 8 and 13-24 are objected to as being dependent upon a rejected base

claim, but would be allowable if rewritten in independent form including all of the

limitations of the base claim and any intervening claims.

26.   The following is a statement of reasons for the indication of allowable subject

matter: prior art of record does not teach or suggests in combination a digital

transmission comprised of a determining step that includes the step recited in claims 8

and 13, respectively.

Conclusion

27.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure. The following patents disclose iterative decoders: Kim et al. (US

Patent No. 6,876,709 B1); Ebel, Sr. (US Patent No. 6,879,648 B2); Nazari et al. (US

Patent No. 6,888,897 B1) and Wolf et al. (US Patent No. 6,898,254 B2)

28.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expireTHREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

29.   Although the rejection of claims 2-5 and 25 include a reference to Yi, they have

not been substantively changed from the Office Action of October 28, 2005. As

dependent claims of claim 1, the rejection of these claims are based on the rejection of

claim 1. In the last Office Action, the rejection indicated that the claims were rejected

based on the references as applied to claim 1 but the Examiner inadvertently omitted

citing the Yi in the rejection of the claims. In this Office Action, the Examiner has

corrected the omission by including a proper reference to Yi in order to be consistent

with the prior art applied in the rejection of claim 1 from which claims 2-5 and 25

depend. Therefore, the rejection of claims 2-5 and 25 are not based on a new ground

of rejection and the finality of this action is proper.

30.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Betsy L. Deppe whose telephone number is (571) 272-

3054. The examiner can normally be reached on Monday, Wednesday and Thursday

(8:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Jay Patel can be reached on (571) 272 - 2988. The fax phone number for

the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Betsy L. Deppe
Primary Examiner
Art Unit 2637